

DEPARTMENT OF THE ARMY
Corps of Engineers, Northwestern Division
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CENWD-NP-ET-OP
Regulation
No. 1130-2-1

15 January 1999

Project Operations
MAINTENANCE PROGRAM

History. This issue is a new regulation for the Northwestern Division (NWD).

Summary. This regulation describes guidance on the maintenance program for fixed equipment at multiple purpose projects within the Northwestern Division in accordance with ER 1130-2-500 and EP 1130-2-500.

1. PURPOSE.

a. This regulation describes the maintenance program for fixed equipment at multiple purpose projects within the Northwestern Division. This regulation does not cover equipment maintenance covered by ER 750-1-1, Materiel Maintenance Policies and EP 750-1-1, Procedural Pamphlet for Material Maintenance Policies.

b. The maintenance procedures to be performed, records to be kept, and the frequency of performance are described in this regulation. The actual implementation of this maintenance program can only be fully realized with a Corps wide standardized format automated maintenance management system in place. Without an automated maintenance management system in place, the timeliness and value to be gained in records keeping are lost. The ability to trend maintenance activities, evaluate effectiveness and plan improvements utilizing these records will be hampered due to the lack of the necessary personnel to perform the aforementioned studies.

2. APPLICABILITY. This regulation is applicable to all elements of the Northwestern Division with responsibility for projects with power, fish, flood control, navigation or recreation facilities.

3. REFERENCES.

a. Required Publications.

(1) ER 750-1-1, Materiel Maintenance Policies. (Cited in paragraph 1a.)

(2) EP 750-1-1, Procedural Pamphlet for Material Maintenance Policies. (Cited in paragraph 1a.)

(3) ER 1130-2-500, Partners and Support (Work Management Policies). (Cited in Summary paragraph.)

(4) EP 1130-2-500, Partners and Support (Work Management Guidance and Procedures). (Cited in Summary paragraph.)

b. Related Publications.

(1) EM 385-1-1, Safety and Health Requirements Manual.

(2) ER1130-2-7, Hydropower Test and Evaluation Function

4. RESPONSIBILITIES. The responsibilities of the Division, District, and Project Offices will be as follows:

a. Division Office.

(1) Provide Quality Assurance oversight of the Districts Quality Control of the maintenance work performed by the projects.

(2) Recommend minimum staffing levels for the maintenance program at NWD Districts.

(3) Review the Districts maintenance outage schedule for the upcoming year as defined in the Hydropower Unit Outage Schedule Guidelines.

b. District Offices.

(1) Provide staffing for the Maintenance Program adequate to perform the required District Quality Control oversight of the projects' implementation of the maintenance program.

(2) Annually review the project maintenance procedures with the intent of optimizing utilization of resources. Recommend the most efficient maintenance intervals and identify failure modes.

(3) Recommend predictive maintenance procedures that may be applicable at the projects. Provide assistance to the projects in development of implementation plans for those predictive maintenance procedures that improve resource utilization and maximize the serviceable life of equipment, structures, and facilities.

(4) Provide assistance to the projects in the economic analysis for repair/replace decisions on major pieces of equipment.

(5) Perform trending analysis of similar equipment types with the intent of optimizing utilization of resources and maximizing the serviceable life of equipment, structures, and facilities.

(6) Ensure that the project Operation & Maintenance (O&M) program makes constructive use of the results of the testing, trending and economic analysis performed.

(7) Ensure that Projects comply with the minimum data record keeping as required by the Corps-wide automated maintenance management system.

(8) Coordinate maintenance schedule with the Project Offices to assure that resource utilization is optimized amongst the projects and serviceable life of equipment, structures, and facilities is maximized.

c. Project Offices.

(1) Develop and coordinate an annual maintenance schedule within the District, as outlined and in accordance with the Hydropower Unit Outage Schedule Guidelines.

(2) Coordinate with other Project Offices a maintenance schedule that optimizes resource utilization, minimizes equipment downtimes and failures, and maximizes the serviceable life of equipment, structures, and facilities.

(3) Review and retain official equipment testing, trending and economic analysis results and records with the equipment histories.

(4) Utilize hydropower test and evaluation program test results/recommendations, predictive maintenance recommendations, and trending and economic analysis results in planning maintenance and repair work, and in evaluating maintenance work and practices.

5. GENERAL. All project equipment, structures and facilities will be maintained in accordance with the project maintenance manual and accompanying equipment specific manuals. Inspection frequency shall be modified as appropriate to affect adequate and efficient maintenance in consideration of experience, equipment characteristics, specialized and routine test results, maintenance history trending analysis and economic repair/replace cost evaluations. The implementation of a Corps wide standardized automated maintenance management system is a prerequisite to the complete implementation of this regulation. The maintenance techniques to be employed are:

PREDICTIVE MAINTENANCE: Maintenance based on a well-developed program that includes equipment history, monitoring, analysis, scheduling, documentation and benchmark testing to determine imminent equipment operational degradation and the implementation of appropriate maintenance repair/replace evaluation. Predictive maintenance also coordinates maintenance resources with operation of the equipment. The program targets equipment maintenance that could compromise performance or safety, while preventing excessive inspections and repairs, all of which have positive impact on the projects ability to meet it's authorized purposes. The keystones to predictive maintenance are equipment monitoring and trending analysis of maintenance histories of similar types of equipment. When put into practice, this will allow efficient utilization of maintenance resources in performance of preventive maintenance repair.

PREVENTIVE MAINTENANCE: Maintenance based on a well-developed program of systematic/periodic inspections, trending analysis of maintenance histories, and repair of equipment and facilities. When put into practice, preventive maintenance will insure optimum utilization of equipment and project facilities and reducing breakdown of essential equipment.

BREAKDOWN MAINTENANCE: Maintenance that is accomplished on occurrence of a breakdown or failure. The type of maintenance practice will be limited to those items of equipment whose failure or breakdown will not affect the accomplishment of the primary missions of the project. This category of maintenance will also be used for those items where the cost of maintenance on a preventive or predictive basis will be more expensive than operating until failure and then repairing or replacing.

6. ORGANIZATION.

a. Division. The Project Operations Branch of the Operations Division will perform the maintenance Quality Assurance oversight function.

b. District Offices. The maintenance Quality Control oversight and maintenance analysis function is assigned to the Operations Division. The District will dedicate adequate resources to perform the above stated functions without the unnecessary burden of duties extraneous to the maintenance program. Each District will coordinate with the Division Project Operations Branch the staffing proposed for the maintenance program.

c. Project Offices. The organization of the Project Offices will be as required to maintain project facilities necessary to meet the HQUSACE benchmarks.

7. MAINTENANCE PROGRAM. As a minimum, each project will have a maintenance program that includes the following:

- a. Automated maintenance management system with database compatible with the other Corps facilities databases.
- b. Maintenance cost limit for use in evaluation of repair/replacement.
- c. Complete recording of equipment procurement/maintenance/life cycle cost history.
- d. Work order and work completion tracking process.
- e. Periodic scheduled review of maintenance practices and not to exceed "maintenance cost limits".
- f. Process for scheduling maintenance.
- g. Process for evaluating maintenance methods.
- h. Process for implementing corrective actions in maintenance practices and for sharing corrective actions with other projects.

FOR THE COMMANDER:



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